

REMARKS

By the above amendment, independent claims 1 and 2 have been amended to recite further features of the present invention as illustrated in Figs. 1 and 10 of the drawings of this application, for example. More particularly, each of independent claims 1 and 2 have been amended to further define the feature of the radiated electromagnetic wave power control means as including a distribution controller (28 of Fig. 1, for example), which is connected to a matching box (10 of Fig. 1) and a high frequency power supply (9 of Fig. 1) which provides the radio frequency current to the LC resonant circuit, wherein the distribution controller controls the radiated electromagnetic wave power by controlling the radio frequency displacement current flowing to the LC resonant circuit (4c, 11, 12a and 12b of Fig. 2, for example, or 11, 12a and 12b and 22a and 22b of Fig. 10, for example). As described at page 19, lines 22-23 of the specification, for example, the capacity of the variable capacitor 11 is controlled from the distribution controller 28 and the drive motor 26. Thus, as shown, the distribution controller is connected to the matching box 10 and high frequency power supply 9 and as described at page 21, line 26 to page 22, line 2, the electromagnetic wave emission power can be controlled by controlling the radio frequency displacement current flowing to the resonant circuit using the capacitor of the variable capacitor 11. That is, as described at page 21, lines 14-19 of the specification, when the capacity of the variable capacitor 11 comes close to resonant conditions, a greater amount of radio frequency current flows to the circuit and when a capacity of the variable capacitor 11 fails to meet the resonant conditions, the radio frequency current flowing to the circuit is reduced. In this manner, as illustrated in Fig. 6 of the drawings of this application, by controlling the capacity of the variable capacity 11 by the distribution controller 28, the high frequency current in the electromagnetic wave radiating portion 4a at the periphery of the vacuum processing chamber and the electromagnetic wave radiating portion 4b at the central portion are

controlled so as to enable proper distribution of the plasma density unit formed at the inner and outer periphery of the vacuum processing chamber. Applicants submit that by the present amendment of claims 1 and 2, such features have now been clearly set forth and since the claims previously recited such features without specifying the distribution controller, matching box and high frequency power supply, such features do not raise new issues requiring further search and/or consideration.

Additionally, by the present amendment, claims 7 and 8 have been made into dependent claims, dependent from claim 1, and claim 3 has been amended in accordance with claims 1 and 2. Applicants submit that independent claims 1 and 2 and dependent claims 3, 7 and 8, as amended, patentably distinguish over the cited art as will become clear from the following discussion.

As to the rejection of claims 1-3, 7 and 8 under 35 U.S.C. 103(a) as being unpatentable over Ostubo et al (Japanese Patent Publication 11-260596) in view of Gesche et al (U.S. 5,140,223) and Tobe et al (U.S. 5,891,349), such rejection is traversed insofar as it is applicable to the present claims, and reconsideration and withdrawal thereof are respectfully requested.

With regard to the requirements to support a rejection under 35 U.S.C. 103, reference is made to the decision of In re Fine, 5 USPQ 2d 1596 (Fed. Cir. 1988), wherein the court pointed out that the PTO has the burden under §103 to establish a prima facie case of obviousness and can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. As noted by the court, whether a particular combination might be "obvious to try" is not a legitimate test of patentability and obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. As further

noted by the court, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

Furthermore, such requirements have been clarified in the recent decision of In re Lee, 61 USPQ 2d 1430 (Fed. Cir. 2002) wherein the court in reversing an obviousness rejection indicated that deficiencies of the cited references cannot be remedied with conclusions about what is "basic knowledge" or "common knowledge".

The court pointed out:

The Examiner's conclusory statements that "the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software" and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial" do not adequately address the issue of motivation to combine. This factual question of motivation is immaterial to patentability, and could not be resolved on subjected belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher."... Thus, the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion. (emphasis added)

Before discussing the cited art, applicants note that as is known in the art, a matching box (see matching box 10 in Fig. 1 of the drawings of this application) is often coupled to the high frequency power supply in a plasma processing apparatus which matching box contains impedance matching circuits which may be in the form of LC circuits. Applicants note that an example of such utilization in the art is shown in the cited patent to Tobe et al (U.S. Patent 5,891,349). That is, as disclosed therein, one terminal of a plasma generating electrode 61 is connected to a power supply source 50, as illustrated in Fig. 1 and the power supply source 50, as described in col. 9, lines 13-31, consists of the impedance matching circuit 51 and

the radio frequency power 52. As noted in such patent, in the impedance matching circuit 51, although a Pi-type circuit is used in the present embodiment, other circuits, e.g., a T-type circuit, may be used and alternating power induced by the radio frequency power 52 is supplied to the plasma generating electrode 61 after impedance-matching with the impedance matching circuit 51. Applicants note that the cited patent to Gesche et al (U.S. Patent 5,140,223) illustrates another matching box in the form of a matching circuit 2 formed of an LC circuit which is connected between the high frequency generator 1 and the electrode 7 of the plasma processing apparatus. See also the description of matching circuits in col. 2, lines 1-25 of Gesche et al.

Turning to the rejection over the cited art, as set forth by the Examiner, the Examiner recognizes that "Otsubo et al fails to teach a radio frequency displacement control means forming a LC circuit" (emphasis added) and that "Otsubo et al fails to specifically teach an electromagnetic wave power control means". (emphasis added) More particularly, it is apparent that irrespective of the features contended to be present in Otsubo et al by the Examiner, Otsubo et al does not disclose or teach "a radiated electromagnetic wave power control means to control the radiated electromagnetic wave power through radio frequency displacement current control means forming an LC resonant circuit, said radiated electromagnetic wave power control means including a distribution controller connected to a matching box and a high frequency power supply which provide the radio frequency displacement current to the LC resonant current; and wherein said distribution controller controls said radiated electromagnetic wave power by controlling said radio frequency displacement current flowing to said LC resonant circuit". In this regard, it is readily apparent Otsubo et al, while disclosing a power supply 1 which supplies a parallel flat electrode 2 with power, does not disclose or teach an impedance matching circuit coupled therebetween in the form of a matching box as known in the art. Thus,

applicants submit that the features of independent claims 1 and 2 and therewith the dependent claims patentably distinguish over Otsubo et al in the sense of 35 U.S.C. 103 and should be considered allowable thereover.

With regard to Gesche et al, the Examiner contends that this patent teaches a plasma processing apparatus where an electromagnetic wave radiating means 1 includes a radio frequency displacement control means forming a LC circuit 9, 10 in order to satisfy adjustment conditions necessary with high frequency power. The Examiner concludes that it would have been obvious to one ordinary skill in the art at the time of the invention to provide the apparatus of Otsubo et al with the radio frequency displacement control means forming an LC circuit as taught by Gesche et al since adjustment conditions necessary with high frequency power are satisfied.

As pointed out above, Gesche et al discloses a matching circuit 2 formed of an LC circuit which serves for impedance matching as clearly described in this patent.

Applicants submit that the matching circuit 2 of Gesche et al corresponds to the matching box of the present invention which is connected to the high frequency power supply (see power supply 1 of Gesche et al) and provides radio frequency displacement current to the electrode 7 of the plasma processing apparatus thereof. However, applicants submit that neither Otsubo et al or Gesche et al taken alone or in any combination thereof disclose or teach a radiated electromagnetic wave power control means to control the radiated electromagnetic wave power through radio frequency displacement current control means forming an LC resonant circuit, wherein the radiated electromagnetic wave power control means includes a distribution controller connected to a matching box and a high frequency power supply which provide the radio frequency displacement current to said LC resonant circuit, and wherein the distribution controller controls the radiated electromagnetic wave power by controlling said radio frequency displacement current flowing to said LC resonant circuit. That is, it is readily apparent that Gesche et al fails to provide a

distribution controller connected to the matching circuit 2 and high frequency power supply 1 of Gesche et al nor the formation of an additional LC resonant circuit and the control in the manner defined. Thus, applicants submit that independent claims 1 and 2 and therewith the dependent claims patentably distinguish over Gesche et al taken alone or in combination with Otsubo et al in the sense of 35 U.S.C. 103.

Applicants note that the Examiner apparently cites Tobe et al for the provision of a radiated electromagnetic wave power control means in the form of a variable capacitor controller 105 to control the radiated electromagnetic wave power through the variable capacitor 81a. Applicants note that irrespective of the Examiner's position, Tobe et al does not disclose or teach a radio frequency displacement current control means forming an LC resonant circuit nor that the radiated electromagnetic wave power control means includes a distribution controller connected to a matching box and a high frequency power supply which provide the radio frequency displacement current to the LC resonant circuit and that the distribution current controller controls the radiated electromagnetic wave power by controlling the radio frequency displacement current flowing to the LC resonant circuit, as recited in independent claims 1 and 2 and the dependent claims of this application. Thus, applicants submit that irrespective of the proposed combination by the Examiner, none of the cited art taken alone or in any combination thereof disclose or teach the claimed features as now recited in independent claims 1 and 2 and the dependent claims in the sense of 35 U.S.C. 103. As noted by the court in In re Fine, supra, "obvious to try" is not the standard of 35 U.S.C. 103. Thus, applicants submit that independent claims 1 and 2 and the dependent claims patentably distinguish over the cited art and should now be in condition for allowance.

With respect to dependent claims 3, 7 and 8, it is noted that such claims recite further features of the present invention with claim 3 reciting the feature of a means

to store a processing procedure to control distribution during plasma processing, and said distribution controllers plasma distribution during plasma processing according to the processing procedure stored in said store means. Irrespective of the position set forth by the Examiner, there is no disclosure or teaching in the cited art of such features. Furthermore, claims 7 and 8 have been amended to be in dependent form and recite the feature of a RF bias circuit which is separated from ground so as to send RF current to the substrate to be processed, and multiple RF current conducting means at a predetermined position and provided with means to control a ratio of RF current flowing from the substrate to be processed to each of the multiple RF current conducting means. Applicants submit that the cited art fails to disclose or teach such features when considered in conjunction with the parent claims thereof. Thus, applicants submit that the dependent claims further patentably distinguish over the cited art and should now be in condition for allowance.

In view of the above amendments and remarks, applicants submit that all claims present in this application patentably distinguish over the cited art, and should now be in condition for allowance. Accordingly, issuance of an action of a favorable nature is courteously solicited.

To the extent necessary, applicant's petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (520.39737X00) and please credit any excess fees to such deposit account.

Respectfully submitted,



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